

### **REMARKS**

Entry of the foregoing, re-examination and reconsideration of the subject matter identified in caption, as amended, pursuant to and consistent with 37 C.F.R. § 1.111, and in light of the remarks which follow, are respectfully requested.

Claim 1 has been amended to incorporate the subject matter of claim 2. In addition, claim 3 has been amended to insert "at least" after "copolymer of" and prior to "a monomer." Further, claims 9 and 12 have been amended, in lines 2 and 4, to replace the word "process" with "--step--". Furthermore, claim 2 has been canceled without prejudice or disclaimer. No new matter has been added.

Upon entry of the Amendment, claims 1 and 3-17 will be all the claims pending in the application.

#### **I. Information Disclosure Statement**

Applicants filed a second Information Disclosure Statement with a Form PTO-1449 on October 29, 2008. The Examiner is respectfully requested to initial and date the Form and return a signed copy to Applicants in the next PTO communication.

#### **II. Response to Objection to the Specification**

The specification was objected to for alleged informalities. Applicants respectfully traverse the objection for the following reasons.

Applicants are permitted to act as their own lexicographers to define any terms in an application. MPEP § 2173.01. In the present case, the specification describes "tetrafluoroethylene-hexafluoropropylene-perfluoro(alkylvinylether) (alkylvinylether) copolymer (hereinafter referred to as 'EPE')," and "polyvinylidene fluoride (hereinafter

referred to as 'PCTFE')" (page 6, lines 23-24 and page 7, line 1). That is, "EPE" and "PCTFE" are intended to represent tetrafluoroethylene-hexafluoropropylene-perfluoro(alkylvinylether) (alkylvinylether) copolymer and polyvinylidene fluoride, respectively. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the objection.

### **III. Response to Objection to the Claims**

Claims 3, 9 and 12 were objected to for alleged informalities. Applicants respectfully submit that claims 3, 9 and 12 as amended do not contain informalities.

In the Amendment, claim 3 has been amended to adopt the language "a polymer or copolymer of at least a monomer selected from the group consisting of..." as suggested by the Examiner. In addition, claims 9 and 12 have been amended, in lines 2 and 4, to replace the word "process" with --step--, as suggested by the Examiner. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the objection to the claims.

### **IV. Response to Rejections under 35 U.S.C. §§ 102(b)/103(a)**

a. Claims 1-8 were rejected under 35 U.S.C. § 102(b) as allegedly anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as allegedly obvious over U.S. Patent No. 5,962,553 to Ellsworth, and its equivalent WO 98/10012. Applicants respectfully submit that the present claims are novel and patentable over Ellsworth for at least the following reasons.

Independent claim 1 recites a heat-meltable fluoropolymer composite composition comprising a heat-meltable fluoropolymer fine powder that is an agglomerate powder having average particle size of not more than 10  $\mu\text{m}$  which comprises agglomerated colloidal fine

particles of the heat-meltable fluoropolymer, and a layered-compound organically modified with tetraphenyl phosphonium ions.

The recited heat-meltable fluoropolymer composite composition can provide excellent thermal conductivity, gas and chemical liquid barrier properties and dynamic properties, such as storage modulus. Specifically, the combination of the specific heat-meltable fluoropolymer fine powder and the particular layered-compound makes it possible to obtain a heat-meltable fluoropolymer composite composition having excellent thermal conductivity, gas and chemical liquid barrier properties and dynamic properties, such as storage modulus, by melt-mixing such layered-compound by exerting shear stress by use of a melt-mixing extruder. As the results in Tables 1 and 2 of the present specification show, compared to Examples 1-9, Comparative Example 1, which did not contain a layered compound, and Comparative Example 2, which contained PFA pellets instead of fine powder, exhibited inferior thermal conductivity, storage modulus and nitrogen gas permeability; and Comparative Example 3, which contained PFA pellets instead of fine powder, exhibited inferior nitrogen gas permeability and storage modulus.

Ellsworth describes a method of making a composite by melt-blending together a melt processable polymer selected from ethylene-tetrafluoroethylene copolymer, perfluorinated ethylene-propylene copolymer, and tetrafluoroethylene-perfluoro(propyl vinyl ether) copolymer and the layered clay modified by the organophosphonium cations having the structure of  $R_1P^+(R_2)_3$  wherein  $R_1$  is a  $C_8$  to  $C_{24}$  alkyl or arylalkyl group and each  $R_2$  is an aryl, arylalkyl, or a  $C_1$  to  $C_6$  alkyl group.

Applicants respectfully submit that the presently claimed composition is different from that described in Ellsworth at least in that the recited layered-compound differs from the layered clay of Ellsworth. Specifically, the modifying organophosphonium cations of

Ellsworth, i.e.,  $R_1P^+(R_2)_3$ , is different from a tetraphenylphosphonium ion because  $R_1$  in the structure is defined to be an alkyl or arylalkyl group and thus cannot be a phenyl group.

Furthermore, Ellsworth does not disclose a heat-meltable fluoropolymer fine powder that is an agglomerate powder having average particle size of not more than 10  $\mu m$  which comprises agglomerated colloidal fine particles of the heat-meltable fluoropolymer, as recited in present claim 1.

In addition, as noted above, the combination of the specific heat-meltable fluoropolymer fine powder and the particular layered-compound can attain excellent results that enables to obtain a heat-meltable fluoropolymer composite composition having excellent thermal conductivity, gas and chemical liquid barrier properties and dynamic properties, such as storage modulus. Ellsworth does not disclose or suggest these effects obtainable in the presently claimed composition.

In view of the foregoing, Applicants respectfully submit that claim 1 is novel and patentable over Ellsworth and thus the rejection should be withdrawn. Additionally, claims 3-8 depend from claim 1, directly or indirectly, and thus are patentable over Ellsworth at least by virtue of their dependency.

**b.** Claims 1-8 were rejected under § 103(a) as allegedly obvious over U.S. Patent No. 6,057,035 to Singh et al., or U.S. Patent No. 6,841,211 to Knoll et al, each individually in view of Ellsworth and its equivalent WO '012. Applicants respectfully submit that the present claims are patentable over Singh et al. or Knoll et al, each in view of Ellsworth for at least the following reasons.

Singh et al. discloses synthesized materials comprising organic-inorganic nanocomposites having alternating organic layers and inorganic layers with intermediate

organic phosphonium surfactants, wherein the inorganic layers are silicate and the organic surfactant is tetraphenyl phosphonium.

Singh et al. merely describes polymers as matrix resin of polyamides, polyether imide, polyimides and poly arylene ethers (column 2, lines 53 to 56). The Office Action concedes that Singh et al. fails to describe the specific heat-meltable fluoropolymer fine powder recited in present claim 1.

As noted above, Ellsworth does not describe or suggest the specific heat-meltable fluoropolymer fine powder recited in present claim 1. As Ellsworth does not rectify the deficiencies of Singh et al., the combination of Singh et al. and Ellsworth still would not result in the subject matter of present claim 1.

Knoll et al. describes, as a material for a container, a nanocomposite comprising a polymer selected from polyolefins, polyamide, ethylene vinyl alcohol copolymers, ethylene vinyl acetate copolymers, polyesters grafted with maleic anhydride, PVdC, aliphatic polyketones and liquid crystalline polymers and nanosize particles of a modified clay. However, Knoll et al. does not describe or suggest the specific heat-meltable fluoropolymer fine powder and the specific layered-compound organically modified with tetraphenyl phosphonium ions recited in present claim 1.

As noted above, Ellsworth does not describe or suggest the specific heat-meltable fluoropolymer fine powder recited in present claim 1. As Ellsworth does not rectify the deficiencies of Knoll et al., the combination of Knoll et al. and Ellsworth still would not result in the subject matter of present claim 1.

In view of the foregoing, Applicants respectfully submit that claim 1 is patentable over Singh et al. or Knoll et al., in view of Ellsworth, and thus the rejection should be

withdrawn. Additionally, claims 3-8 depend from claim 1, directly or indirectly, and thus are patentable over the cited references at least by virtue of their dependency.

**V. Conclusion**


From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order and such action is earnestly solicited. If there are any questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned at his earliest convenience.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

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